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FROM THEORY TO THE CLASSROOM, BACKGROUND INFORMATION ON THE FIRST GRADE PROJECT IN NEW YORK CITY SCHOOLS.

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BECAUSE TEACHERS NEED RESOURCES BOTH TO ASSESS AND TO DEVELOP INTELLECTUAL SKILLS IN YOUNG CHILDREN, THE NEW YORK CITY BOARD OF EDUCATION AND THE EDUCATIONAL TESTING SERVICE UNDERTOOK A PROJECT IN THE FIRST GRADES OF 25 ELEMENTARY SCHOOLS DURING THE 1964-1965 SCHOOL YEAR. FOUR ASSUMPTIONS FORMED THE THEORETICAL BASE OF THE PROJECT--(1) INTELLIGENCE IS A SET OF DEVELOPED SKILLS, NOT AN INHERITED CHARACTERISTIC, (2) INTELLECTUAL SKILLS DEVELOP AS A RESULT OF INTERACTION WITH ENVIRONMENT, (3) LEARNING MOTIVATION IS INHERENT IN CHILDREN, AND (4) INTELLECTUAL DEVELOPMENT IS SEQUENTIAL AND PRODUCES QUALITATIVE CHANGE IN THOUGHT PROCESSES. THESE ASSUMPTIONS WERE APPLIED TO CLASSROOM SITUATIONS THROUGH THE DEVELOPMENT OF (1) A GUIDE FOR TEACHERS, "LET'S LOOK AT FIRST GRADERS," (2) BOTH TESTING AND INSTRUCTIONAL MATERIALS FOR CLASSROOM USE, AND (3) WRITTEN EXERCISES, ALL OF WHICH RELATED TO INTELLECTUAL RATHER THAN TO EMOTIONAL, SOCIAL, OR MOTOR SKILLS. THESE INITIAL TRYOUT MATERIALS WERE USED AND APPRAISED BY PARTICIPATING EDUCATORS AND REVISED FOR USE IN A LARGER NUMBER OF SCHOOLS IN 1965-66. FUTURE RESEARCH WAS TO DETERMINE THE LONG-RANGE EFFECTS OF THE PROJECT. (LG)

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from THEORY to the CLASSROOM

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Background Information on the First Grade Project in New York City Schools

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This project was initiated and directed by Joseph O. Loretan, Deputy Superintendent of Schools, New York City, and Henry Chauncey, President of Educational Testing Service. It was supported financially by the New York City Board of Education and Educational Testing Service.

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INTRODUCTION

Any new idea is likely to be most sensibly assessed when its background is known and its setting understood. This has been our philosophy in connection with the experimental work now being conducted in some of New York City's first grade classes. Working cooperatively, the New York City Board of Education and Educational Testing Service are moving forward to achieve the following objectives:

- To develop materials that will help teachers better understand the intellectual development of young children and techniques that will aid them in making systematic observations of important behavioral signs of the child's developmental level.
- To develop educational materials, lesson plans, and special tasks that will give children an opportunity to demonstrate certain skills, and, in many instances, will provide them with the kind of experience needed to develop their understanding.
- To develop a series of written exercises that will give the teacher information on a number of aspects of the child's learning abilities. An important feature of these exercises is that they are designed to give the child extensive practice before a measurement for record is made.

Like any other new idea in our field, this one has a background that covers many years and a setting that is as contemporary as tomorrow. This booklet has been written for those members of the New York City school staff and of the interested public, who would like to know some of the background out of which our experimental work with teachers in the first grade has grown. The booklet explains why we instituted the project and the basic approach that has been taken. Its major purpose, however, is to provide a thumbnail sketch of the basic theory of the project and a description of how that theory has been and is being practiced in our classrooms.

Those who are interested in the whole critical process of understanding a young child's mental development may find some fresh approaches described here. Those who wonder about the capacities of our school people to cope with the bewildering assortment of backgrounds our pupils represent may find some reasons for confidence. This booklet is about something we hope we can do successfully—written while we are undertaking the first steps. Perhaps your understanding of what we are doing will enhance our chances of success.

Joseph O. Loretan
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AN OLD PROBLEM IN MODERN CONTEXT

The question which Joseph O. Loretan, Deputy Superintendent of New York City Schools, had in mind when he met with Educational Testing Service staff in December of 1963 was one of the simplest and most profound an educator can ask:

> How can New York City help its teachers better understand and assess the intellectual development of every entering school child, so that they may teach every child more effectively?

From Socrates . . . to Dewey . . . to Mrs. Thomas in the Bronx and Mrs. Coleman in Brooklyn, educators have eternally struggled with the problem of finding out *where* young minds are, in order to meet them there. The problem is not a new one.

If the problem is not new, however, the circumstances of its modern setting are. For centuries teachers have answered the challenge of understanding and assessing their pupils by relying on some (often implicit) set of assumptions about human intelligence and some form of testing. From time to time throughout history either the assumptions about intelligence or the forms of testing have changed. Today at least two factors in the contemporary situation suggest that it is again time to revise our ideas and our tools and try to find a fresh approach to the problem.

The first of these factors is simply the reality of modern urban society. The diversity of backgrounds represented in our large cities is now so great that it challenges some of the assumptions involved in the interpretation of present standardized tests. Even more important, however, is the factor of new information and understanding gained during the last two decades concerning the development of the child. While education and psychology are a long way from having all the answers, there is clearly a growing body of knowledge regarding human intelligence: what processes are involved, how these are nurtured, and how they develop. This new knowledge casts grave doubts on many conceptions about intelligence that have permeated our thinking for the last 100 years. What the contemporary context calls for, then, are *new approaches to assessment and instruction in terms of our contemporary understanding.* It was in an effort to find these new approaches that Educational Testing Service and the New York City Board of Education officially joined forces in a cooperative project.

Henry Chauncey
PRESIDENT
EDUCATIONAL TESTING SERVICE

WHY A FRESH APPROACH IS NEEDED

Teachers have for centuries used some form of testing. The earliest recorded use of formal testing was in the year 1115 B.C., at the beginning of the Chan dynasty in China, when examinations were established for candidates for public office. The examining procedures consisted of job-sample tests requiring proficiency in the five basic arts of music, archery, horsemanship, writing and arithmetic, and a test of knowledge in the rites and ceremonies of public office(1). From these ancient Chinese practices to the standardized multiple-choice examinations of present day America, testing has always been a method for estimating the extent to which a person *has developed* a specific type of knowledge or skill. In the mass testing practices of today, however, there is a tendency to lose sight of this one essential function of the test.

With great refinements in our measurement techniques over the last 40 years and increasing numbers of students to be assessed by our schools, there has been a growing reliance on standardized tests prepared by test experts outside of the school. Today standardized tests are used extensively throughout the country for a variety of educational purposes. There is little doubt that the specialized science and technology of measurement have provided the schools with better and more useful tests. But like all earmarks of progress, this particular specialization has its drawback—it has meant the separation of test maker and test user. In the case of tests used to assess *learning ability* this separation of test and teacher has often resulted in a confusion of the underlying test assumptions with assumptions about the nature of intelligence. Specifically, there is a rather widely accepted idea that intelligence means a person's inherited potential and that an ability test or intelligence test measures this potential. While the idea of intelligence as inherited potential will be dealt with specifically in the next section, suffice it to say here that the confusion of this idea with the underlying assumptions of standardized tests constitutes, in and of itself, one limitation to the continued use of these tests.

On the other hand, standardized ability tests have been used effectively by many educators for a variety of purposes. A further examination of the actual underlying characteristics of current standardized tests may clarify the difficulties involved in depending solely on them as the most suitable approach to assessing the intellectual development of New York City's young school children.

Basic Characteristics of Standardized Tests

Essentially, standardized testing compares the performance of one student with the performance of some specified group of students on a particular task. A student's score is then expressed in terms of how he compares with the group. That is, the score—be it a percentile, standard score, grade placement score, or IQ—is a measure of *relative achievement.*

A second basic characteristic of standardized tests is that they measure *past learning* of one kind or another. While it is usually obvious that the questions on achievement tests relate directly to past learning in a specific subject matter, most ability tests measure previous school learning of a general nature. Such tests are quite appropriately called "school ability" or "scholastic aptitude" tests, and what they measure is the general development of a child's verbal and numerical skills—the kind of skills normally emphasized in school. The assumption of the test, the interpretation of the child's test performance, and the logical inference drawn from it are really quite simple:

ASSUMPTION: Assuming equal exposure to a school environment and school-type learning,

SCORE INTERPRETATION: the children who have benefited most from this exposure—i.e., those who have developed their verbal and numerical skills most highly,

INFERENCE: are the children who will continue to benefit most from exposure to school.

This inference is straightforward and based simply on the observation of what has happened in the past. And for a number of purposes, this inference has proved reasonably valid, provided the test user has exercised proper precautions in score interpretation. Overriding all other precautions set forth by test publishers is the obvious warning that: *The assumption of equal exposure to a school environment must hold reasonably well, or the score will not accurately reflect the student's demonstrated ability to benefit from past school experience.*

It is evident, however, that aptitude tests which assume the development of certain skills based on past school learning are inappropriate for use in the early elementary grades. Such tests are more appropriately administered only after the child has had a sufficient exposure to the school's instruction. In practice, this has usually meant that scholastic aptitude tests are not administered below grade 4.

Limitations for the Early Grades

Certain ability tests are commonly administered below grade 4, however, and these make a slightly different assumption. This assumption—inherent in most general IQ tests—is simply that *on the whole, children have had very similar environmental experiences.* If this is true, one might test for certain skills children presumably should have learned from their general exposure to life, compare them on the basis of test results, and make the same kind of inference as the aptitude test. Needless to say, this assumption of similar environmental experience is clearly inappropriate when applied to children in large urban areas who come from a wide diversity of backgrounds. In this way, then, modern urban society poses some problems for current ability tests used at the early grade levels.

An even greater limitation to the practical utility of such tests is posed by our growing knowledge of intellectual development in the early years. Standardized tests are *empirical instruments*—their inference is based strictly on what has happened in the past under the conditions of the past. A test score tells the teacher how child "X" stands in comparison to other children with respect to some specific developed skill. The inference to be drawn from this score has to do with the child's continued relative achievement at some later point in time. What currently available tests *do not* tell the teacher is *how* children learn, *how* their intellect develops, *where* they are with respect to some scale of development, or *what* the teacher may do to foster development one notch further along the scale. To do this, tests would have to be based more on a theoretical understanding of how abilities develop than they are at present.

The fact that ability tests are not now rooted in theory is inconsequential in many situations, since test information may still be valuable for a variety of purposes. However, it does constitute a limitation for the teacher of the early grades whose responsibility it is to develop the broad intellectual foundation for all future learning. And as the full importance of these early years becomes increasingly evident, it will become increasingly important for every first grade teacher to understand *how* intellect develops . . . and to help develop it.

Thus, for the job of assessing the intellectual development of young children in the New York City schools, sole reliance on current ability tests seems an inadequate approach. What should be sought is the compilation of the best available theory and evidence we now have and the translation of that information into practical, helpful tools for the teacher. As we come nearer to achieving this goal, it will become increasingly difficult to distinguish between the functions of teaching and testing. They will blend imperceptibly into each other.

OUTLINE OF A WORKING THEORY

Ask about the "development" of young children in almost any circle of teachers today, and most of the ensuing discussion will center around various aspects of emotional, social and motor development. It is not that teachers are unconcerned about intellectual development, but rather that psychology and education have given them few resources to draw upon. There are already substantial signs of change in this picture, and it is almost certain to change dramatically within the next few years.

Since World War II, and more notably within the last decade, various avenues of research have provided us with important insights about the nature of intellectual processes—insights which carry significant implications for educational practice. There will, however, be no systematic attempt to review and integrate these various lines of research in this booklet.* The following is simply an attempt to set forth and explain some of the major theoretical ideas upon which the New York City project rests. These are presented below in the form of four basic assumptions:

1. Intelligence is essentially a set of developed skills rather than an inherited characteristic.
2. Intellectual skills develop as a result of the child's continuous interaction with his environment.
3. Children are inherently motivated to explore and master their environment.
4. Intellect develops through a sequence of related stages that produce *qualitative change* in the way children think and are able to deal with the world.

ASSUMPTION 1: *Intelligence is essentially a set of developed skills rather than an inherited characteristic.*

The idea that intelligence is man's overall potential "to understand," or "to acquire knowledge," or "to profit from experience" or simply "to act intelligently"—and that this potential is fixed by heredity—has permeated our thinking to the extent that it is now commonly accepted as "fact." It is so central to everyday thinking about man that to challenge it may arouse nothing short of an emotional re-

*A bibliography of reference sources is included at the back for those who wish to pursue the topic further.

sponse. Nonetheless, it is the educator's responsibility to set this idea in perspective and attempt to analyze it objectively.

The question of how man acquires knowledge is certainly not new. It intrigued the ancient Greek philosophers and is the subject of one of Plato's finest dialogues. The beginning of modern concern with the problem, however, is usually dated with the 17th century philosopher John Locke's writing of an *Essay Concerning Human Understanding*. In this work, Locke set down his now famous "appeal to experience" argument—the belief that the mind at birth is a blank upon which human experience inscribes all knowledge.

The roots of a scientific belief in fixed, inherited intelligence may be traced to Darwin's theory of evolution in the mid 19th century. Although not stated outright, implicit in this theory is the assumption that the characteristics of any living thing are predetermined by genetic heredity. It is probable, however, that ". . . this implicit assumption would never have caught on with anything like the force it did had it not been for two outstanding figures in the history of relatively recent thought"(4). The first of these figures, Sir Francis Galton, is generally conceded to be the father of modern psychological measurement. Although Galton's measures were a far cry from modern tests (he was interested in such things as reflex times), he nevertheless founded the first laboratory for the systematic measurement of human characteristics. And it was Galton who made *explicit* the notion that adult characteristics are determined by heredity. Both Galton's ideas and measures were brought to America in the late 1800's. The other outstanding figure was G. Stanley Hall, a psychologist and cofounder of Clark University, who helped spread Galton's ideas in this country. Hall was profoundly influenced by the theory of evolution, and he transmitted his belief in the notion of "fixed intelligence" to his students at Clark. Among his students were three of the most important leaders of the "new psychology" in American—a psychology of individual differences that perfected measurement techniques and introduced tests that were the forerunners of those used today.

In a monumental analysis, J. McV. Hunt (3) traces not only this history of the idea of fixed intelligence, but also the history of research investigations that seemed to support this idea. He then goes on to tie together the various strains of more recent research concerning the effects of early experience on intellectual development—from studies on human and animal learning to recent investigations of brain functioning, to the prolific research of the Swiss biologist, Jean Piaget, on the development of thought processes in young children. A significant aspect of many of these studies is that they have freed

themselves from the idea of intelligence as an overall potential and have concentrated on the various skills and elements of thinking per se. For the first time, modern science is looking at intelligence as a set of skills and techniques by which a person represents information from the environment and then acts upon that information in such a way as to produce more and more abstract ideas. Hunt's conclusion from this analysis—and one shared by a number of psychologists and educators today—is simply that the belief in fixed intelligence is no longer tenable. Intelligence may be more profitably thought of and studied as a set of skills which emerge only as they are nurtured by the environment. To the extent that this assumption continues to produce insightful research, education will become increasingly concerned with the *development* of those skills by which we form and effectively use abstract ideas.

ASSUMPTION 2: *Intellectual skills develop as a result of the child's continuous interaction with his environment.*

The idea of fixed intelligence carried with it the twin notion of a fixed rate of development (maturation rate) that was also determined by genetic make-up. In other words, both the extent and rate of intellectual development were thought to be predetermined by heredity and relatively immune to environmental influence. The term "maturation" thus became commonly used to refer to a biological process that went on inside the child.

Among other things, this position implied that education could present the child with knowledge and skills once his intelligence had matured sufficiently to grasp them, but that there was little education could *or should* do to influence the basic course of his development and the resulting amount of intelligence he possessed. Like the metamorphosis of the tadpole to the frog, the development of the child's intelligence was thought to have a course prescribed by nature. In fact, if training or "tampering" with the course of development had any effect at all, it was thought that it would have a harmful effect. Such a view is hardly inspiring for any educator, past or present, but it is a view still adhered to by many today.

An interaction viewpoint, on the other hand, places great stress on the child's environmental experiences as the vital factor influencing development, especially during the early years of life. It also stresses the importance of continuity of experiences within the environment. A detailed presentation of the diverse body of research evidence supporting this theory may also be found in Hunt's book (3). Essentially the theory holds that intellectual skills develop as a result of the child's interaction with his environment, especially his encounter

with a wide variety of sensory experiences, and that these skills develop in a series of related stages. That is, the skills acquired at one stage become in turn the building blocks for the acquisition of new skills at the next stage. If there is a dearth of "appropriate experiences" at any point along the way and the skills of a given stage are not sufficiently nurtured, they can add little to the next stage. To the extent that this occurs, the child's entire complex of thought processes will be correspondingly weakened.

Such a viewpoint suggests at least two significant implications for the teacher of young children. In the first place it suggests the vital importance of programming "appropriate experiences" for the child—of providing him with a situation in which he can apply acquired skills to master new learnings. It also suggests that those involved in early education must explore the possibility of *compensating* for inadequate or inappropriate experience of the past.

ASSUMPTION 3: *Children are inherently motivated to explore and master their environment.*

A baby does not have to be threatened, cajoled, or enticed to turn his head toward a sound, explore his toes, attempt to crawl, or bang the pot lids together. Perhaps this statement sounds like obvious trivia to anyone who has ever watched a baby, but it is in just such activities as "toe exploration" that learning—and intellectual development—begin. Throughout the first few years of life, children generally engage in such learning activities with natural enthusiasm and delight.

Yet our psychological theories of learning have long tended to ignore this basic observation of human life. While these theories have given us great insight into principles that influence certain types of learning, they have tended to lead us astray with respect to the ways in which children learn and develop their basic thinking skills. For the most part, these theories have been founded on what might be called "push-pull" assumptions, in which the human is viewed as an essentially inert creature who must be activated. In the case of the "push" theories, learning is instigated by internal drives and impulses; while in the case of the "pull" theories, it is motivated by external incentives and reinforcements. Although this type of assumption began to be repudiated in the 1930's by certain personality theorists, it was not until after World War II that learning psychology started giving serious consideration to the idea that curious exploration and constructive learning behavior might be inherently satisfying and "natural" to man.

There is an important qualification to this position that must be

kept in mind. The child's natural tendency to explore, manipulate, and master the environment—his "motivation for competency" as one theorist has called it (5)—does not continue to operate automatically for an indefinite period of time. This built-in mechanism for learning may either be sustained, encouraged and directed by a responsive environment or dulled by an unresponsive one. The school may have a crucial influence in determining what happens on this score, for the implication seems quite clear that an environment which fosters learning motivated by "fear of failure" or the desire for "external rewards" is an environment that will soon stifle the child's natural motivation for learning.

ASSUMPTION 4: *Intellect develops through a sequence of related stages that produce qualitative change in the way children think and are able to deal with the world.*

Human intelligence does not grow like an oak tree, simply getting bigger and bigger. Although development is characterized by gradualness and continuity, it also involves striking *qualitative* changes in the way children think. These changes occur as the child progressively develops more effective ways of representing information from his environment and then acting upon that information; and this developmental process follows a sequence of related stages. While "representing information" and "acting upon information" may sound like strange terms for talking about intelligence, recent studies of intellectual development have made headway because they have focused largely on these two issues: 1) the ways a person learns to select and represent information from the environment; and 2) the ways he then acts upon these representations in order to make inferences, reach conclusions, or form more abstract ideas.

Of central importance to the New York City project are the two broad and overlapping stages of *pre-logical* and *logical concrete* thinking.* To oversimplify the case, pre-logical thought is characterized by concrete images or "picture-like" representations of the environment, while logical concrete thought is characterized by more abstract and symbolic representations. Until a child has developed to the stage of more symbolic thought structures, he has great difficulty understanding and dealing with his world logically.

The child's learning of language during the pre-logical stage is a vital acquisition, but it is one that can often throw confusion into the

*These stages are based primarily on the work and theory of Jean Piaget (2), but we have chosen to use slightly different terminology than his.

picture of his true developmental stage. The confusion occurs because children can use words in such a way as to indicate greater understanding than they actually possess. Their ability to verbalize may be way ahead of their level of logical thinking skills. For example, a child may fluently use class labels he has heard—"dogs and cats are animals"—without really grasping the idea of classification. On the other hand, the ability to manipulate language is an important tool for the development of more abstract and symbolic thinking skills. *Appropriate* experience in the language environment is therefore crucial to optimum intellectual growth.

While any detailed discussion of the "stage concept" of development is beyond the scope of this booklet, a few of the points which form an important part of the project theory are discussed below:

- Logical concrete thinking, as the name implies, enables the child to deal logically with concrete ideas, objects and events. Pre-logical thinking, on the other hand, does not operate by the rules of adult logic. Thus, the simplest kind of logical inference (A = B; B = C; Therefore: A = C) is not mastered by the pre-logical child. If block A is exactly the same size as block B; and block B is exactly the same size as block C; the younger, pre-logical child cannot *infer* that blocks A and C must also be of equal size. Rather, he must rely on a direct *visual comparison* of A and C in order to reach the conclusion that they are equal.

- The pre-logical and logical concrete stages are broad and overlapping, so age boundaries are likely to be misleading when applied to any one child. Generally speaking, however, the pre-logical stage extends roughly from 18 months to about age 6 or 7. The logical concrete stage extends roughly from age 6 or 7 to about age 11 or 12. The overlapping nature of the stages also implies that there are periods of transition in which children may show characteristics of *both* stages.

- Transition periods are periods of some normal disruption in intellectual life. As the child learns new ways to structure his world and develops new concepts, the world may become somewhat confusing because his understanding of it has changed. As the older, familiar and more stable concepts begin to break down, the child starts to bring more adequate but less stable concepts to bear on his environment. The result is that his behavior may appear less predictable or even confusing. For example, he may not function at the *same* level or stage across *all* areas of his intellectual life. At certain times his level of functioning may even vacillate *within* a given area. In handling quantitative relationships, for instance,

the child may show logical understanding at one time and fail to demonstrate it the next.

- There are specific characteristics of thinking that identify each stage of development. While it is not important to discuss them from a theoretical standpoint, it is important to note that these characteristics of the child's thought are inferred from his *behavior*. In other words, signs of developmental level may be observed in the child's behavior—presumably by anyone who knows what to look for.

- A variety of *concrete sensory experiences*, the opportunity for *active manipulation of things*, and certain kinds of *language experience* are all vital factors that foster the child's development from pre-logical to logical concrete thinking. In other words, the pre-logical child does not develop the skills necessary for logical thinking simply by hearing logical principles repeated to him. While this type of purely verbal instruction may be appropriate for an adult, the pre-logical child has not yet developed the intellectual equipment to handle such experience in a meaningful way. He may learn to repeat verbal instruction by rote memory, but it will add little to the development of his abilities to think.

These, then, are some of the major theoretical ideas upon which the New York City project is based. While everyone would not subscribe to this particular set of assumptions, it is safe to say that there is no theory to which all would subscribe. Much more important than unanimous agreement, however, is the fact that this position is supported by a large body of evidence and that it has obvious educational significance and utility.

PUTTING THE THEORY TO WORK

From the practitioner's viewpoint, theories must be put to work to be worth the words it takes to describe them. This calls for some explicit extensions of the theory to the school setting. We are still in the process of formulating some extensions and reformulating others, but three initial assumptions were made in order to bridge the gap from theory to classroom.

First, we assumed that teachers can detect important clues of intellectual development by observing the child's behavior, provided they know what to look for.

A second assumption was that certain "unnatural" disruptions of intellectual life occur when the child's environment changes drastically and his experiences are discontinuous. The transition from home to school is just such a disruption for most children. But for most children it is only short-lived because the two environments contain many important similarities. The kinds of things to which the child is exposed and the kinds of behaviors that are expected of him at home are generally the kinds of things to which he is exposed and the kinds of behaviors that are expected of him at school. Thus, the transition poses few major or lasting problems.

But this is not always the case. For some children, the school situation may be so radically different from their previous home environment that they are totally unable to apply their past learning to it. They may appear confused, dull, or even "unteachable."

Finally, it was assumed that *if* the school can provide "appropriate experiences" for the child—situations in which he can apply past learning to master new concepts which stimulate further modifications and refinements of his thinking skills—*then* intellectual development and a "natural" motivation for learning will be fostered. To help teachers discover what constitutes an "appropriate experience" is, of course, a primary objective of this project. Whatever else may be involved, however, the right match between the child and his immediate learning environment will depend in large part both upon the child's *stage* of development and upon the *content* of his past learning environment.

With these additional assumptions as an educational base, the project strategy was to proceed along three related lines of work: 1) the development of a *Guide* for teachers; 2) the development of assessment and instructional materials for the classroom; and 3) the development of a series of written exercises.

The Guide—Let's Look at First Graders

An essential step in putting any theory to work is translating it into terms that can be *used*. Since astute teaching in the primary grades has always centered around careful observation of the child, and since signs of a child's developmental stage may be observed in his behavior, the most useful translation seemed to be a behavioral one.

Upon closer inspection, this translation step actually becomes a two-fold job: 1) translating our theoretical concepts about intellectual development into nontechnical, common sense English; and 2) illustrating these concepts with concrete examples of behavior that are likely to be visible to the teacher. We have attempted to accomplish both of these objectives in a *Guide* for teachers entitled *Let's Look at First Graders*. In chronological order, however, it was the second job we tackled first.

Research literature naturally provided one source of behavioral illustrations of developmental concepts. But illustrations taken from a research setting may appear unrealistic or even pallid to the classroom teacher. Thus, for a second source of behavioral clues we turned to another group of professionals—teachers in the primary grades who see six-year-olds daily. In the Spring of 1964 the project staff visited some 100 teachers in New York City elementary schools (including at least one school in each borough) to ask them about the behavioral signs of intellect *they* saw in the classroom. No mention was made of any theory—teachers were simply encouraged to talk about specific occasions when particular children, by their behavior, gave the teacher deeper insight into their intellectual development.

Specifically, teachers were asked: "What kinds of things have you seen a child *do* that made you think . . . 'that child is smart'?" The teachers were most cooperative in their response and proved to be a rich source of behavioral illustrations. Some behaviors, repeated at practically every school we visited, were the more familiar and common signs that teachers are used to looking for—behavior such as "following directions" or "organizing work well." In other words, they were the behaviors of a child who has had the advantage of a home environment that is much like the school environment—a child whose transition from home to school has caused little disruption in his intellectual life. Other behaviors were not mentioned so often, but came from extremely perceptive teachers. These rarer illustrations focused on behaviors of the shy child, behaviors of the child from a disadvantaged learning environment, and behaviors that might be considered annoying or impertinent by a teacher.

Naturally we could not and did not use every behavior that every teacher mentioned. Some behavioral examples stirred a great deal of

controversy among the teachers themselves, and others simply did not illustrate the particular kinds of development in which we were interested. For example, behaviors concerning motor coordination and emotional stability were ruled out by the decision to concentrate on *intellectual* skills. In the final analysis, however, the perceptions of New York City classroom teachers provided a great many of the concrete examples we needed to illustrate important developmental concepts.

The next job was to translate the theoretical concepts into common sense English for inclusion in the *Guide, Let's Look at First Graders.* The *Guide* is divided into six broad Areas, with various major subheadings within each Area. Each major subheading is devoted to a brief discussion of some important aspect of intellectual development. Where possible, we have tried to trace each intellectual skill in a truly developmental way, indicating the nature of growth through the pre-logical stage to its manifestation in logical concrete thought. Our primary concern, however, has been to describe and illustrate important characteristics of logical concrete thinking. Thus, every behavioral illustration used in the *Guide* is, in our best judgment, an illustration of logical concrete behavior.

The six broad Areas and the concepts discussed within each Area in the *Guide* are:

Major Area	*Developmental Concept*
1. Basic Language Skills	Auditory Discrimination and Attention Listening Comprehension Learning to Communicate Language for Thinking
2. Concepts of Space and Time	Learning Shapes and Forms Spatial Perspective The Notion of Time
3. Beginning Logical Concepts	Logical Classification Concepts of Relationship
4. Beginning Mathematical Concepts	The Conservation of Quantity One-to-One Correspondence Number Relations
5. The Growth of Reasoning Skills	Understanding Cause and Effect Reasoning by Association Reasoning by Inference
6. General Signs of Development	Growing Awareness and Responsiveness Directed Activity General Knowledge Developing Imagination

By discussing various aspects of intellectual development in non-technical language, the *Guide* serves as a simple *instructional* handbook for teachers. By illustrating each aspect of development with concrete examples of behavior, it also serves as a practical *assessment* tool for the teacher. Although the examples in the *Guide* are simply illustrative and not exhaustive of all behaviors that might indicate logical concrete thinking, an informal but systematic record of the clues a teacher has been able to observe should help her to estimate the approximate stage of each child's intellectual development.

In summary, then, the first phase of the project is aimed at providing materials and a method by which first grade teachers can become familiar with important aspects of intellectual development in six-year-olds and can keep a systematic record of those signs of development that will be useful.

Assessment and Instructional Materials for the Classroom

From the very beginning of the project, when the staff was combing research literature for specific examples of concrete logical thinking, it was apparent that not all of the behavioral signs could be seen by just waiting for them to happen. Some of them—often important ones—have little chance of happening in the ordinary course of events in the first grade classroom or on the playground.

It was also apparent from the beginning of the project that there are children for whom the classroom situation is so strange or so threatening that they simply withdraw and reveal little behavior of any kind. These are the "hard-to-see" children who rarely engage in any classroom activities in which their developed intellectual skills can be observed.

For these reasons, the project was planned to consist of a second phase or element, which concentrated on the development of various materials and tasks for *eliciting intellectual behavior*. If, for any one of several reasons, the teacher is unable to see important signs of intellect in the spontaneous behavior of children, she may use these tasks and materials to make sure they have an opportunity to demonstrate certain skills and understandings. Some of the tasks are amenable to class administration and some to small groups or to individual children. Some require no special equipment beyond what is normally found in the classroom or is easily obtainable by the teacher; others have been designed and constructed by the project staff. All of these materials are described in detail in a supplementary manual for

teachers, *Instructional and Assessment Materials for First Graders.*

Many of the materials have some "built-in" provision for obtaining a permanent record of the child's performance. That is, the child indicates his performance in some simple way on paper. He may copy the numbers that make a balance beam "balance," cross out a picture that completes a matrix puzzle, or draw something to complete the task. In other cases the teacher must make notes directly from her observation of the situation. To summarize, all of the tasks are designed to give children an opportunity to demonstrate some kind of logical concrete intellectual behavior and to provide teachers with a relatively standard opportunity to observe this behavior.

In addition to allowing a child to demonstrate his understanding and the teacher to observe it, many of these tasks also have *instructional* value in that they provide children with the kind of experience needed to *develop* their understanding. It is at this point that what is often called "assessment" or "measurement" blends wholly into what is really teaching.

Since the functions of observation and instruction frequently overlap, the purpose in presenting a particular task really becomes a matter of emphasis. A teacher may be primarily interested in observing a particular child or the entire class (perhaps in order to decide upon appropriate instruction), or primarily concerned with providing an instructional situation. The line between these two functions is often thin and blurred. In general, however, whenever the developmental tasks are used as instructional situations, they should not be thought of as "one-shot" affairs in which the child is told he is either "right" or "wrong." Nor are the tasks even to be thought of as situations in which the teacher *teaches*, in the sense that she provides the child directly with certain knowledge or principles. Rather, they are game-like situations designed to provide an opportunity for the child to *discover* new concepts and *develop* new skills of thinking. Thus, the major instructional value of many of these tasks lies in the fact that:

1. They have a self-corrective "feedback" feature that enables the child to *see for himself* whether he is right or wrong in a particular response. He does not have to be told by the teacher.
2. They involve materials that children can manipulate over and over again on their own.

Together, these two features mean that if interest is maintained (if the game or task situation is not too unfamiliar and threatening), children may "play" with the materials for however long it takes them to master the problem. The length of time involved may range from minutes to repeated play sessions with the materials over a

period of days, weeks, or even months. But failure experience, at least in the usual absolute sense of that term, rarely occurs.

The Written Exercises

The third of the related elements of developmental work in the project are the written exercises. This final element is the most "test-like" of any. Although the written exercises are similar in some ways to existing tests, they do contain at least two important features that make them quite distinct.

First, *the exercises are related to various theoretical concepts in the Guide.* Specifically, they have been designed to tap the child's understanding and developed ability in the areas of:

Shapes and Forms
Spatial Relations
Time Concepts
Mathematics
Communication Skills
Logical Reasoning

Secondly, *they are designed to give the child extensive practice* before any "measure for the record" is made. In each of the areas listed above, there are actually five exercises, one to be given on each day of the week. The first three are for practice and instructional purposes; only the results of the last two exercises will be recorded by the teacher as a measure of the child's developed skill in that area. By this procedure we hope not only to give the child an opportunity to become familiar with the mechanics of "test-taking" but also to instruct him in those concepts which we consider important enough to test. In effect, we are attempting to make instructional materials and "test" materials one and the same thing.

In final form, the written exercises will be designed to give the teacher, early in the school year, information on a number of aspects of the child's developed intellectual skills. Tentatively it is planned that this information will include both a learning rate score (and index of the child's improvement with instruction) and an achievement score (the result of his performance on the last two exercises).

PROGRESS AND FUTURE PLANS

Initial forms of all project materials were used in 25 of New York City's elementary schools during the 1964–65 school year. Special workshop sessions and visits of the project staff to individual schools served as a means for instructing the teachers in the project philosophy and methods. The materials were introduced in stages, with the *Guide* being presented in the fall and the balance of the materials introduced at various intervals after December.

In no sense has the past year been a year of "experimental research." It has been a year of developmental work and initial tryout. To those principals and teachers who have participated in this tryout, it would be difficult to express adequate appreciation. They have gently but firmly pointed out any impracticable techniques or downright mistakes all along the way, and have supplied us with better ideas in their place. Their enthusiasm about the project as a whole has been our greatest signal of success. All the project materials are currently undergoing revision based on the data we obtained and on the constructive criticism of the principals and teachers.

During the 1965–66 academic year, the revised project materials will be introduced into a larger number of schools for further tryout. At the same time, however, research investigations will be carried out in a selected sample of schools in an attempt to get some more definitive answers about the effects of the project and the course of intellectual development in New York City's school children.

Materials of the kind being developed in this project are never completely final or finished—they cannot be. Not only is knowledge extending but the patterns of society are changing all the time. What we do hope, however, is that our general theoretical approach and the classroom tools we have derived from it will prove more suitable to our times and amenable to modification in the light of future knowledge and changing demands. We are encouraged to think that they will.

At present, special recognition has been given to the fact that children enrolling in the schools of New York City come from widely differing cultural, ethnic, and social backgrounds and to the fact that the schools have a responsibility to *reach and teach* all of these children. Crystal ball gazing is always a dangerous pastime. But if this project produces some improved materials and methods for use in the first grade, it would be expected that similar efforts will be undertaken in the future at other grade levels.

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PARTICIPATING SCHOOLS

School	*Principal*	*Teachers*
	BRONX	
P.S. 14	Catherine Raschke	Marion Carey Catherine DeLuse
P.S. 43	Mabel Kennedy	Joan E. Dunford Adriene Levi Roslyn Silverman
P.S. 53	Nathan Spector	Elizabeth Deely Lois Hershowitz Grayce Ryan
P.S. 81	Joseph McCarthy	Alma Sasserath Eunice Thomas
P.S. 121	Clement Finkelstein	Beverly Abrams Faye Dill Gertrude Hirsch
	BROOKLYN	
P.S. 26	Louis Debin	Yetta Grossbard Judy McDermott
P.S. 29	Alfred Melov	Joan Gallotello Phyllis Pincus
P.S. 42	Barney Weiss	Patricia Dorfman Carmen Rosario
P.S. 80	Joseph Janovsky	Sarah Cohen Reyna Hisiger Hazel Kay
P.S. 102	Alice L. Cook	Diane Procacci Helen Siegal
P.S. 190	Herbert Gross	Edith Curtis Judith Sager Sherry Sobel
P.S. 257	Ralph Brande	Naomi Coleman Maureen Ryan Angela Walker
P.S. 286	Max F. Shapiro	Evelyn Adel Lillian Kanfer Betty Morganroth
P.S. 298	Frederick Entman	Ruth Nathanson Anne Pugliese Terricita Watkins Doris Watson

	MANHATTAN	
P.S. 24	Isidore Platt	Lena Gold Gladys Phillips Marsha Pollak
P.S. 42	Martin Glassner	Carol A. Amorose Felicia Castiglia Mary Harley
P.S. 80	Sidney Sincoff	Beryl Berry Mary Kantor Thomasina Matthews
P.S. 145	Carl B. Erdberg	Marie Malone Marilyn Posner Julie Small
P.S. 168	Sol B. Lubow	Edith Malmed Diane Mulcahy Nancy Reilly
	QUEENS	
P.S. 7	Harold McKee	Maria Della Vecchia Alice Fox Kathleen Steubben
P.S. 63	Grace English	Florence Storch Linda Viola
P.S. 89	Reba Mayer	Sadie Fischbein Lucille Nallin Natalie Weinstein
P.S. 123	Eugenie G. Nadelman	Marilyn Bergofin Ellen Lubin Ann Marion
P.S. 187	Paul Keller	Margaret Driscoll Caroline Peterson
	RICHMOND	
P.S. 44	Michael J. Romano	Josephine Bressel Corinne Cassati Fannie S. Mirrer Mary Reilly Frances Ripps